

XLV.—*On some rare and interesting Crustacea from the Dogger Bank collected by Ernest W. L. Holt, Esq.* By THOMAS SCOTT, F.L.S., Naturalist to the Fishery Board for Scotland.

THE Crustacea which form the subject of this memoir were presented to me several months ago by my friend Mr. Ernest W. L. Holt. They were collected by him at the south-west end of the Dogger Bank in April 1892, while he was engaged on board the S.S. 'Resolute' carrying out a series of fishery investigations for the Marine Biological Association. The collection in which the Crustacea occurred was made by fixing a tow-net to the end of the beam of the trawl, as is done on board the Scottish Fishery Steamer 'Garland,' and which is a very effective method for capturing those free-swimming marine organisms whose habitat is usually near the bottom. The trawl on this occasion was down for about eight hours in water the depth of which varied from 20 to 26 fathoms. The locality where the collection was made may be given approximately as 70 to 80 miles east by north of Spurn Head at the mouth of the Humber. When the trawl was hauled up the tow-net fixed to the beam was found to contain a large quantity of living matter consisting chiefly of small Crustacea. In this single tow-net gathering the number of species of Crustacea that have been identified are as follows, viz. :—Three species of Decapoda, four species of Schizopoda, four species of Cumacea, twenty-two species of Amphipoda, and five species of Copepoda; a Pteropod, *Clione limacina* (Phipps) (*Clione borealis*, Pallas), was also obtained in the same collection.

Some of the Crustacea obtained in this gathering have not, so far as I know, been previously recorded from the English coasts; indeed the collection as a whole is a very interesting one, and shows how much may be done towards increasing our knowledge of the distribution of the British marine fauna by the adoption of proper methods of investigation, and also thereby tending to throw additional light on obscure fishery questions. Some remarks of the Rev. A. M. Norman on the importance of a knowledge of the Crustacea in connexion with fishery investigations may be appropriately quoted here. Dr. Norman says:—"No real progress can be made with respect to the food of fishes until investigators are familiar with those Crustacea which constitute so large a portion of that food" *.

* 'Fourth Annual Report of the Fishery Board for Scotland,' p. 155

The following is a classified list of the species of Crustacea captured by Mr. Holt and arranged in the order in which they are referred to above.

Suborder DECAPODA.

Crangon Allmanni, Kinahan.

Crangon Allmanni, Kinahan, Proc. Dublin Nat. Hist. Soc. vol. iv. p. 80 (1857).

This species appears to be usually confined to off-shore waters, and may be distinguished from *Crangon vulgaris* not only by its colour when alive, but also by the abdomen having posteriorly a distinct median dorsal groove. *Crangon Allmanni* frequently forms an important part of the food of the haddock and the cod.

Crangon nanus, Kröyer.

Crangon nanus, Kröyer, Naturhistorisk Tidsskrift, ser. 1, vol. iv. p. 231 (1842).

This appears to be the *Crangon bispinosa*, Bell (Brit. Stalk-eyed Crust. p. 268, 1853), and seems to have a fairly wide distribution in British waters. It is, as its name implies, one of the smaller species of *Crangon*.

Pandalus annulicornis, Leach.

Pandalus annulicornis, Leach, Malac. Brit. t. xl.; Bell, Brit. Stalk-eyed Crust. p. 297.

This is one of the most valuable of the smaller Crustacea for food purposes. A regular and remunerative fishery of the "prawn" and the "common shrimp" is carried on at several places round the British coasts. The larger food-fishes also prey frequently on *Pandalus annulicornis*, the fragments of these Crustaceans often forming a large portion of the contents of the stomachs of such fishes. It appeared to be scarce at the south-west end of the Dogger Bank at the time the present tow-net gathering was collected.

Suborder SCHIZOPODA*.

Gastrosaccus spinifer (Goës).

Mysis spinifera, Goës, Crust. decapoda podoph. marina Succæ, p. 14 (1863).

(1886); Rev. A. M. Norman, "On a *Crangon*, some Schizopoda, and Cumacea new to or rare in the British Seas."

* See also the Rev. A. M. Norman's memoir on the British Mysidæ (Ann. & Mag. Nat. Hist. ser. 6, vol. x. pp. 143-166 and 242-263, pls. ix. and x., 1892).

Gastrosaccus spinifer, Stebbing, Ann. & Mag. Nat. Hist. ser. 5, vol. vi. pp. 114 and 328, pl. iii.

This crustacean has been obtained at several places in Scotland and the following English localities:—Off Whitby, Yorkshire, and at Starcross, Devon; and the locality now recorded is a new station for it on the east coast.

Erythrops Goëssii, G. O. Sars.

Nematopus Goëssii, G. O. Sars, Beretning om en i Somm. 1865 foret. Zool. Reise ved Kyst. af Christianias og Christiansands Stifter, p. 15 (1866).

Erythrops Goëssii, id. Monogr. Mysider, p. 24, pl. i. (1870).

There are three species of *Erythrops* recorded for the British seas, and the largest of them scarcely reaches half an inch in length. *Erythrops Goëssii* appears to be the rarest of the three in British waters; the only locality from which it has been recorded hitherto is the Firth of Forth, where it sometimes occurs in considerable numbers. The occurrence of *Erythrops Goëssii* in Mr. Holt's collection from the south-west end of the Dogger Bank is therefore of interest not only because it is a new station for the species, but also because this station is much further southward than any of its hitherto recorded habitats.

Mysidopsis angusta, G. O. Sars.

Mysidopsis angusta, G. O. Sars, Zool. Reise 1863 i Christiania Stift. p. 30 (1864).

This species is readily distinguished from the other three British species of *Mysidopsis* by its *slightly forked* telson. I know of only four British records for *Mysidopsis angusta*, and they are all from places in Scotland; the present record therefore is an extension of its distribution on the east coast.

Schistomysis ornata (G. O. Sars).

Mysis ornata, G. O. Sars, Beret. om en i Somm. 1863 foret. Zool. Reise, p. 18 (1864).

Schistomysis ornata, Norman, "British Mysidæ," Ann. & Mag. Nat. Hist. ser. 6, vol. x. p. 255 (1892).

This is a widely distributed species in the British seas; it is a handsomely coloured species. The Schizopoda—especially those of the family Euphausiidae—form an important part of the food of certain fishes.

Suborder CUMACEA.

Lamprops fasciata, G. O. Sars.

Lamprops fasciata, G. O. Sars, Om en i Somm. 1862 foret. Zool. Reise i Christianias og Trondhjems Stifter, 1863, p. 44.

The carapace of this species has three oblique lateral folds and the telson is furnished with five apical spines. *Lamprops fasciata* is very prettily marked. It was somewhat rare in the gathering from the Dogger Bank.

Diastylis Rathkii (Kröyer).

Cuma Rathkii, Kröyer, "Fire nye Arter af Slægten *Cuma*," Naturhistorisk Tidsskrift, ser. 1, vol. iii. p. 508 (1841).

Diastylis Rathkii, Sp. Bate, Ann. & Mag. Nat. Hist. vol. xvii. p. 451 (1856).

This is a large and fine species and occurs sometimes in considerable numbers. In the Dogger-Bank gathering it was somewhat scarce. I have on several occasions observed *Diastylis Rathkii* in the stomachs of fishes.

Diastylis rugosa, G. O. Sars.

Diastylis rugosa, G. O. Sars, "Om den aberrante Krebsdyrgruppe Cumacea og dens Nordiske Arter," Selskab. Forhandl. 1864, p. 41.

This species is considerably smaller than the last and was rather uncommon in the gathering.

Pseudocuma cercaria (Van Beneden).

Leucon cercaria, Van Beneden, Recherches sur la Faune littorale de Belgique, Crust., 1860, p. 85, pl. xiv.

Pseudocuma cercaria, G. O. Sars, Middlehavets Cumaceer, 1879, p. 114, pls. xl., xli., and xlii.

This was a moderately common form in the Dogger-Bank gathering. The species appears to be widely distributed in the British seas.

Suborder AMPHIPODA.

Parathemisto oblivia (Kröyer).

Hyperia obliviu, Kröyer, Grøn. Amphip. p. 70, pl. iv. fig. 19 (1838).

Parathemisto oblivia, G. O. Sars, Crust. of Norway, p. 10, pl. v. fig. 1 (1890).

This species was common in the Dogger-Bank gathering. It is one of the most important among the Amphipoda as fish-food. *Hyperia oblivia* appears to be more or less frequent

all over the North Sea, but is usually of rare occurrence on the west coast of Scotland. During the whole of my residence at Tarbert, Loch Fyne, in 1885-86, the only member of the Hyperiidæ I observed was *Hyperia galba*, a few specimens of which were obtained in one of the *Aurelia aurita* that had been cast ashore by the incoming tide. Mr. David Robertson states that he obtained a single specimen of *Parathemisto oblivia* near the Mull of Cantire; and this was the only one he remembers ever having met with in the Firth of Clyde*.

Euthemisto compressa (Goës).

Themisto compressa, Goës, Öfvers. af Kongl. Svenska Vetensk.-Akad. Förbandl. (1865).

Euthemisto compressa, G. O. Sars, Crust. of Norway, p. 12, pl. v. fig. 2 (1890).

This is a larger species than the last, and apparently somewhat erratic in its movements so far as its presence on the east coasts of England and Scotland is concerned. At one time it may be of frequent occurrence, or even quite common, while at another time not a single specimen can be obtained. A few specimens only were observed in the tow-net gathering from the Dogger Bank.

Callisoma crenata, Spence Bate.

Callisoma crenata, Spence Bate, Cat. Amphip. Brit. Mus. p. 85, pl. xiv. fig. 5 (1862).

Callisoma crenata appears to be a generally distributed species. If a dead half-decayed fish, sea-urchin, or such like is brought up in the dredge, *Callisoma crenata* is almost sure to be present, and sometimes in swarms, feeding on the putrid animal matter.

Hippomedon denticulatus (Spence Bate).

Anomys denticulatus, Spence Bate, Cat. Amphip. Crust. Brit. Mus. p. 75 (1862).

Hippomedon denticulatus, G. O. Sars, Crust. of Norway. p. 56, pl. xx. (1890).

This fine species was frequent in the tow-net material from the Dogger Bank. It is readily distinguished from its allies "by the peculiar form of the tooth-like posterior projection of the last epimeral plates of the metasome" †.

* 'The Amphipoda and Isopoda of the Firth of Clyde,' by David Robertson, F.L.S., F.G.S., p. 65 (1888).

† G. O. Sars, *op. cit.* p. 57.

Orchomenella ciliata, G. O. Sars.

Orchomenella ciliata, G. O. Sars, Crust. of Norway, p. 69, pl. xxv. fig. 2 (1891).

This somewhat rare species was obtained sparingly in the Dogger-Bank gathering. It appears to have a fairly wide distribution, as Chevreux records it from the coasts of France.

Tryphosites longipes (Spence Bate).

Anonyx longipes, Spence Bate, Cat. Amphip. Brit. Mus. p. 79, pl. xiii. fig. 4 (1862).

Tryphosites longipes, G. O. Sars, Crust. of Norway, p. 81, pl. xxviii. fig. 3, pl. xxix. fig. 1.

This species occurred very sparingly in the Dogger-Bank material. Its known distribution extends to the Mediterranean.

Bathyporeia norvegica, G. O. Sars.

Bathyporeia norvegica, G. O. Sars, Crust. of Norway, p. 128, pl. xliii. (1891).

Bathyporeia norvegica was first recorded as British in the Ann. & Mag. Nat. Hist. 1892, ser. 6, vol. x. p. 205, from specimens obtained in the Firth of Forth. This appears to be the first record of its occurrence on the English coast. It is readily distinguished from any other allied form by its larger size and especially by the tooth-like form of the postero-lateral angles of the epimeral plates of the third segment of the metasome.

Bathyporeia pelagica, Spence Bate.

Bathyporeia pelagica, Spence Bate, Cat. Amphip. Brit. Mus. p. 174, pl. xxxi. fig. 6 (1862).

This is a smaller species than the last, and it has a fairly wide distribution. Several specimens occurred in the Dogger-Bank tow-net gathering.

Argissa hamatipes (Norman).

Syrrhoë hamatipes, Norman, Report of the 38th Meeting of the Brit. Assoc., 1868.

Argissa typica, Boeck, Crust. Amphip. bor. et arct. p. 45 (1870); G. O. Sars, Crust. of Norway, p. 141, pl. xlvi. (1891).

Argissa hamatipes, Scott, Eleventh Annual Report of the Fishery Board for Scotland, pt. iii. p. 213, pl. v. figs. 30, 31.

Several specimens of this curious species were obtained in the gathering from the Dogger Bank. The present is a new record of the species for the English east coast. It has been obtained at several places on the Scotch coasts.

Ampelisca typica (Spence Bate).

Tetromatus typicus, Spence Bate, Brit. Assoc. Report, 1855, p. 58.

Ampelisca Gaimardii, id. (non Kröyer), Brit. Sess.-eyed Crust. vol. i. p. 127 (1863).

Ampelisca typica, G. O. Sars, Crust. of Norway, p. 165, pl. lvii. (1891).

Several specimens of this species were obtained.

Amphilocheus tenuimanus, Boeck.

Amphilocheus tenuimanus, Boeck, Crust. Amphip. bor. et arct. p. 51 (1870).

The characters that distinguish this species from *Amphilocheus manudens* are somewhat obscure. There is no tooth-like projection at the base of the dactyli of the gnathopods as there is in those of *Amphilocheus manudens*. The last pair of epimeral plates of the metasome are simply angular and want the small but distinct denticle at the postero-lateral angles, and the telson is also longer. The present is the only record I know of for *Amphilocheus tenuimanus* for the east coast of Great Britain. Mr. David Robertson has taken it in the Firth of Clyde, near Cumbrae.

Amphilocheoides pusillus, G. O. Sars.

Amphilocheoides pusillus, G. O. Sars, Crust. of Norway, p. 222, pl. lxxvi. (1892); T. and A. Scott, Ann. & Mag. Nat. Hist. ser. 6, vol. xiii. p. 147 (1894).

This species has only recently been added to the British fauna from specimens obtained in the Firth of Forth and St. Andrews Bay; and the present record is an interesting addition to our knowledge of its distribution in British waters.

Stenothoë marina (Spence Bate).

Montagua marina, Spence Bate, Cat. Amphip. Brit. Mus. p. 56, pl. viii. fig. 5 (1862).

Stenothoë marina, G. O. Sars, Crust. of Norway, p. 236, pl. lxxx. (1892).

A few specimens of this widely distributed species were obtained in the Dogger-Bank gathering.

Periocolodes longimanus (Spence Bate).

Monocolodes longimanus, Spence Bate and Westwood, Brit. Sess.-eyed Crust. vol. xi. p. 507 (1869).

Periocolodes longimanus, G. O. Sars, Crust. of Norway, p. 313, pl. cx. fig. 2, pl. cxi. fig. 1.

The distribution of this species extends from Norway to the Mediterranean, and it is of frequent occurrence in the British seas.

Pontocrates norvegicus, Boeck.

Pontocrates norvegicus, Boeck, Crust. Amphip. bor. et arct. p. 91 (1870).
Krøjgera altamarina, Spence Bate and Westwood, Brit. Sess.-eyed Crust. vol. i. p. 177 (1863).

A few specimens of this species were obtained in the material from the Dogger Bank.

Synchelidium brevicarpum (Spence Bate).

Krøjgera brevicarpa, Bate and Westwood, Brit. Sess.-eyed Crust. vol. xi. p. 508 (1869).
Synchelidium brevicarpum, G. O. Sars, Crust. of Norway, p. 318, pl. cxii. fig. 1 (1892).

This is a small species with curious gnathopods. It does not appear to be very common in the British seas.

Halimedon Mülleri, Boeck.

Halimedon Mölleri, Boeck, Crust. Amphip. bor. et arct. p. 89 (changed afterwards by Boeck to *H. Mülleri*).
Halimedon Mülleri, G. O. Sars, Crust. of Norway, p. 327, pl. cxv. (1892).

This was a somewhat rare species in the Dogger-Bank material.

Iphimedia ? obesa, Rathke.

Iphimedia obesa, Rathke, Acta Acad. Leop. t. xx. p. 85, pl. i. fig. 1 (1843).

A specimen apparently belonging to this species but somewhat imperfect occurred in the gathering from the Dogger Bank. The species has a wide distribution in the British seas. It is frequently ornamented with transverse bands usually of a rich brownish or reddish colour.

Apherusa borealis (Boeck).

Apherusa borealis (Boeck), G. O. Sars, Crust. of Norway, p. 441, pl. clv. fig. 2 (1893).

This species was of common occurrence in the Dogger-Bank material. The two dorsal tooth-like projections of the metasome appear to be more strongly developed in the male

than in the female; the telson is in the form of an elongate narrow triangular plate with an acute apex; a minute hair springs from a small marginal notch on each side of the apex. This is also one of the more common species of Amphipods in the Firth of Forth.

Megaluropus agilis, Norman.

Megaluropus agilis, Norman, Ann. & Mag. Nat. Hist. ser. 6, vol. iii. p. 446, pl. xviii. figs. 1-10 (1889); id. ibid. ser. 6, vol. iv. p. 123, pl. x. figs. 15-17 (1889).

Several specimens of this Amphipod were obtained in the material from the Dogger Bank; it appears to be generally distributed round the British coasts.

Dulichia, sp.

An imperfect specimen of *Dulichia* was obtained in the Dogger-Bank material; some of the more important appendages were absent, rendering specific identification doubtful.

Caprella, sp.

A few specimens of a *Caprella* were also obtained, but they were too imperfect for the species to be satisfactorily made out.

Suborder COPEPODA.

This suborder was represented in the Dogger-Bank gathering by five species, all of which, with one exception, are more or less common in the British seas. The species are as follows:—*Calanus finmarchicus* (Gunner), one of the most abundant species in the gathering; *Pseudocalanus elongatus*, Boeck, frequent; *Temora longicornis* (O. F. Müller), abundant; *Mitridia armata*, Boeck, rare; and *Centropages hamatus* (Lilljeborg), frequent.

There was another and a smaller gathering, collected on the same date and near the same locality as the one now described; but the species were much fewer, and those that were represented in the material did not differ from those already referred to. In both gatherings *Sagittæ* were more or less common, and many of them were of large size.